Larry McGee
DIVISION OF MILLER INGENUITY

Radio DTMF Activator

Model No. 14-99005V2-*xyz*

To avoid damaging the internal relay, ensure that power supply positive and power supply negative are connected to the B12 and N12 terminals, respectively.

Installation, Operation & Service Manual

Manual P/N PM-14-99005V2-06rA, 01/2015

Miller Ingenuity, 1155 East Eighth St., Winona, MN
(507) 452-2461 www.millerингenuity.com

Foreword

The Radio DTMF Activator is designed to provide reliable remote-control-by-radio in an easy to install and compact package. It is available in two form factors to make installation in many situations extremely easy.

Version 2 of the radio DTMF Activator (14-99005V2), released in January 2006, incorporates several operational modes into each unit. Previously, each Activator was programmed with a single operational mode, as specified by the customer. With "V2", multiple modes are programmed into each Activator. Inform the factory of the mode you wish to have activated. The user can also change the mode in the field.

Once the operational mode is set (normally done at the factory), setting up the unit for use is accomplished by setting rotary switches on the front panel and LEDs enable quick and easy status verification.

Multiple operational modes programmed into each Activator enable it to be used for many applications. However, if your installation requires an operational mode different from what is normally provided, please contact the factory for availability.

Please feel free to send us your comments on your experience with the Radio DTMF Activator.

MANUAL SECTIONS

I. INTRODUCTION: DESCRIPTION & APPLICATIONS 3

II. SPECIFICATIONS 6

III. INSTALLATION, SET-UP & ADJUSTMENTS 7

IV. OPERATION.....11

V. SERVICE & ORDERING.....12

VI. DRAWINGS 13

Revisions:
Rev 01 – Original Publication
Rev 02 – Added 3rd operational mode
Rev 03 – Added explanation of DTMF codes and further clarified operation of "Momentary Contact" operational mode. Added further notes in "Antenna" section.
Rev 04 – New circuit board incorporating additional modes implemented. This revision includes changing the Model Number to 19-99005V2-x. This version started production in January of 2006. NOTE: For "pre-V2" Activators, use Rev 03 Manual (or earlier, as appropriate).
Rev 05 – Added note on cover page regarding proper connection of power leads.
Rev 06 – Added Mode 13, updates for surface mount circuit board, updated contact info

I. INTRODUCTION: DESCRIPTION & APPLICATIONS

The LMG 14-99005V2-*xyz* Radio DTMF Activator provides radio-controlled relay contacts for control of gates, switches and other equipment. It is available in signal relay rack and surface mounting configurations. Multiple operational modes are built into the unit and are user-selectable.

a. Description

The Radio DTMF Activator includes a radio receiver, circuit board and connecting cables enclosed in a metal case, which is mounted on a heavy-duty phenolic base. The phenolic base provides electrical isolation. See specifications for more information. (NOTE: IF AN EXTERNAL ANTENNA WITH GROUNDED SHIELD IS CONNECTED TO THE RADIO DTMF ACTIVATOR, THIS WILL GROUND THE POWER SUPPLY. THE USER MUST EVALUATE GROUND ISOLATION REQUIREMENTS FOR THE PARTICULAR INSTALLATION.) The radio receiver is programmable and synthesized. Any of the eight frequencies programmed into the radio may be selected with the rotary switch on the front of the unit. The circuit board includes power conditioning circuitry and a 1-6 digit DTMF decoder. The DTMF digits are programmed with rotary switches on the front of the unit.

Currently, 14 operational modes are available for your Activator. Specify your mode choice as a portion of the part number of your Activator. The mode of the Activator can be changed in the field. See Section II, “Specifications”, for a description of each mode and how to incorporate your choice of mode into the part number. See Section V, “Service & Ordering”, for instructions for specifying your Activator’s configuration.

b. Applications

The Radio DTMF Activator provides radio-controlled relay contacts for convenient control of gates, switches and other equipment. Note that it does not provide an “answer-back”, so it is recommended that it be used in situations where the user has visual or other feedback to determine that the desired actions have been initiated.

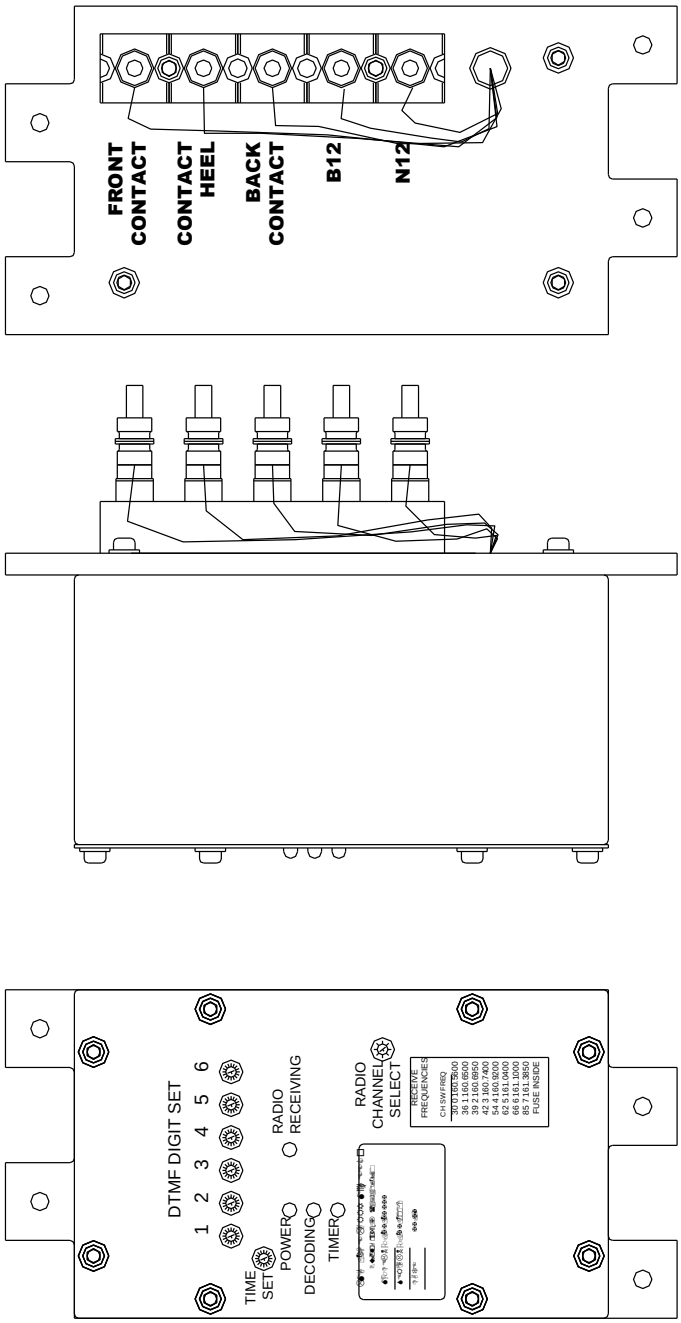


FIGURE 1
RACK-MOUNTING RADIO DTMF ACTIVATOR

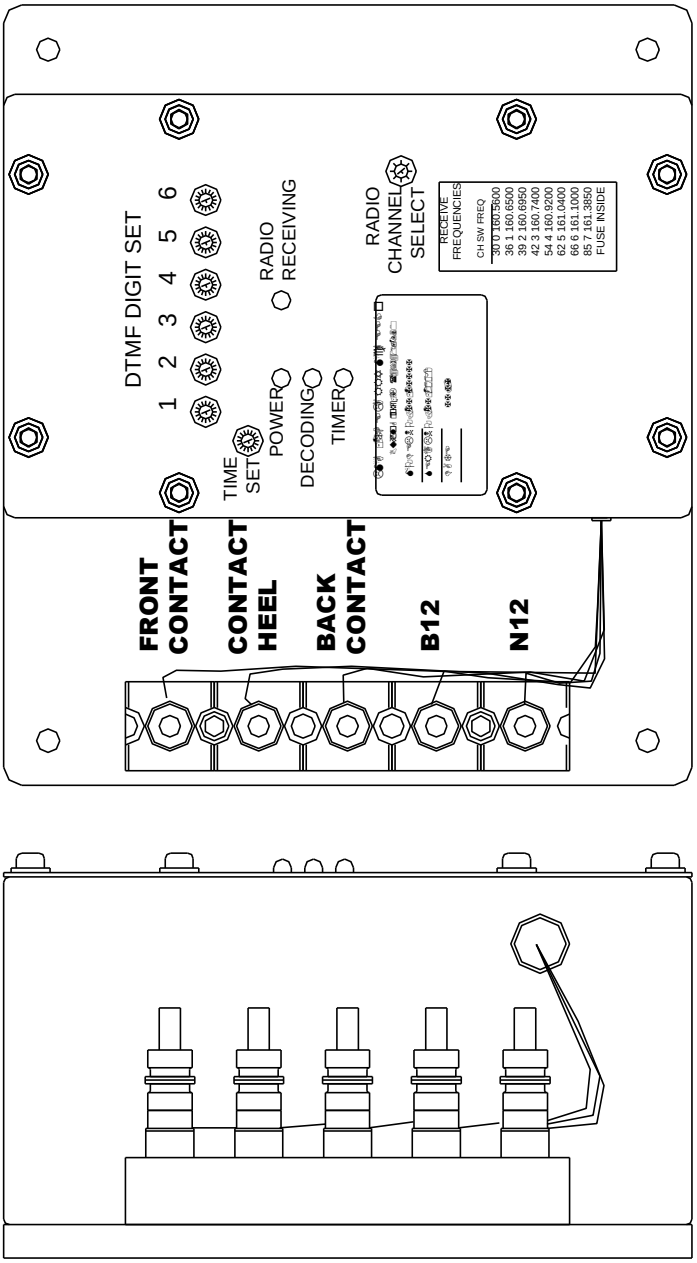


FIGURE 2
SURFACE-MOUNTING RADIO DTMF ACTIVATOR

II. SPECIFICATIONS

Specifications:

Input Power	8 to 35 volts DC, 160 milliamperes max. (@8 volts, lower current at higher voltages), diode protected against reversed polarity.
Radio	Programmable VHF, 8 synthesized channels
Temperature Range	Operational: -30C (-22F) to +60C (+140F)
Storage:	-40C (-40F) to +80C (+176F).
Size	Relay-Rack mounting version, overall dimensions are 4 3/4 x 9 3/4" x 7". Wall-mounting version, overall dimensions are 8 3/4" x 7 3/4" x 4 3/8".
Weight	5 pounds.
Isolation	Tested to 2000 VAC between case and each terminal. CONNECTING AN ANTENNA WITH A GROUNDED SHIELD WILL GROUND THE POWER SUPPLY NEGATIVE. THE USER MUST DETERMINE ELECTRICAL ISOLATION REQUIREMENTS FOR EACH INSTALLATION.
Surge Protection	1500 Watt, 36 Volt TVS between Power and Ground.
Relay Contacts	Relay contact rated 1 amp @ 30 VDC. One "Form C" contact available. ("Front contact", "Back Contact" and "Contact Heel").
Terminals	Standard 1/4" signal-type terminals for power and relay contacts.
DTMF Code	1-6 digit, selected with rotary switches on front panel. The DTMF detector resets after app. 2 seconds without decoding a digit.

Note about relay contact terminology: The following terminology applies to the relay contacts of the Radio DTMF Activator –

Front Contact =	Normally Open Contact (open unless the relay is energized)
Contact Heel =	Contact Arm
Back Contact =	Normally Closed Contact (closed unless the relay is energized)

Operational Modes

The Activator has 14 modes built-in and accessible to the user. These are:

0) Code toggles relay. I.E. enter code to turn relay on, enter code again to turn relay off. Timer setting irrelevant.
1) Code alone trips relay. Timer = 1 second per increment.
2) Code alone trips relay. Timer = 10 seconds per increment.
3) Code alone trips relay. Timer = 1 minute per increment.
4) Code then " * " to turn relay on, or Code then" # " to turn relay off. There is no timer setting.
5) Code then " * " to turn relay on, or Code then " # " to turn relay off. Timer = 1 sec per increment.
6) Code then " * " to turn relay on, or Code then " # " to turn relay off. Timer = 10 sec per increment.
7) Code then " * " to turn relay on, or Code then " # " to turn relay off. Timer = 1 minute per increment.
8) Code then " * " enables relay 1. Code then " # " enables relay 2. Timer = 1 sec per increment.
9) Code then " * " enables relay 1. Code then " # " enables relay 2. Timer = 10 sec per increment.

10) Code then " * " enables relay 1. Code then " # " enables relay 2. Timer = 1 minute per increment.
11) Code then " * " then "xxx" (enter time in seconds) I.E. to enable the relay for 19 seconds you would enter "123*019" assuming the code of the unit was "123".
12) Code then " * " then "xxx" (enter time in minutes) I.E. to enable the relay for 27 minutes you would enter "123*027" assuming the code of the unit was "123".
13) Code then " # " to turn relay on, or Code then " * " to turn relay off. Timer = 10 sec per increment. (Note: Same as Mode 6, except the "*" and "#" are switched.)

When the Activator is in a mode utilizing timed relay operation (modes 1,2,3,5,6,7,8,9,10,13), the "TIME SET" switch on the front panel determines the amount of time the relay will remain energized once the proper DTMF code has been detected (if the "relay off" command has not been sent in modes 5, 6, 7 and 13). Switch positions 1-15 correspond to 1 – 15 time increments, respectively. If the DTMF code is detected again during this time, the timing cycle will re-initialize. The time increments are each 1 second or 10 seconds or 1 minute, depending on mode.

Radio Receiver	The Radio Receiver used is a Ritron DTX Plus transceiver. Only the receiver section of the radio is used in this device. Larry McGee Company reserves the right to substitute a receiver (transceiver) of similar specifications.

See Section V (Service & Ordering) for instructions for specifying your Activator's configuration.

III. INSTALLATION, SET-UP & ADJUSTMENTS

Physical Installation
The Radio DTMF Activator is available in two mounting versions.
The signal rack-mounting version mounts in (2) rack spaces, using ¼" mounting hardware.
The wall mounting version mounts on a flat surface, using (4) fasteners up to ¼" diameter.

Electrical Installation

WARNING: THE RADIO DTMF ACTIVATOR HAS BEEN DESIGNED TO PROVIDE 2,000 VAC ELECTRICAL ISOLATION BETWEEN THE POWER TERMINALS AND THE CASE. IF AN ANTENNA WITH EARTH GROUNDED SHIELD IS ATTACHED TO IT, THIS WILL CAUSE THE POWER SUPPLY "RETURN" TO BE EARTH GROUNDED.
USE OF AN ISOLATION POWER SUPPLY IS RECOMMENDED WHERE THIS IS A PROBLEM.

Changing the Operational Mode
Before installing your Activator, ensure it is in the appropriate Operational Mode (see Mode list in Section II, "Specifications" (above)). To change the operational mode of the DTMF activator, follow these steps:

#1) Remove power to unit.
#2) Remove the front cover to gain access to the circuit board. Locate J5 and place the shorting jumper on position " B ". See Figure 3.
#3) Rotate ALL the rotary switches on the front of the unit to the " 0 " position.
#4) Apply power to unit, you should now see the Power LED flashing. If not check the above steps.

#5) Locate the MODE CHART in the manual. Once you have determined what mode you would like, rotate the “TIME SET” rotary switch to the mode position you desire. Then remove the shorting jumper on J5 from position B and place it on position A. The Power LED should now be on solid. The unit has saved this new mode setting in its non-volatile storage memory, and will return to that mode in the event of a loss & restore of power.

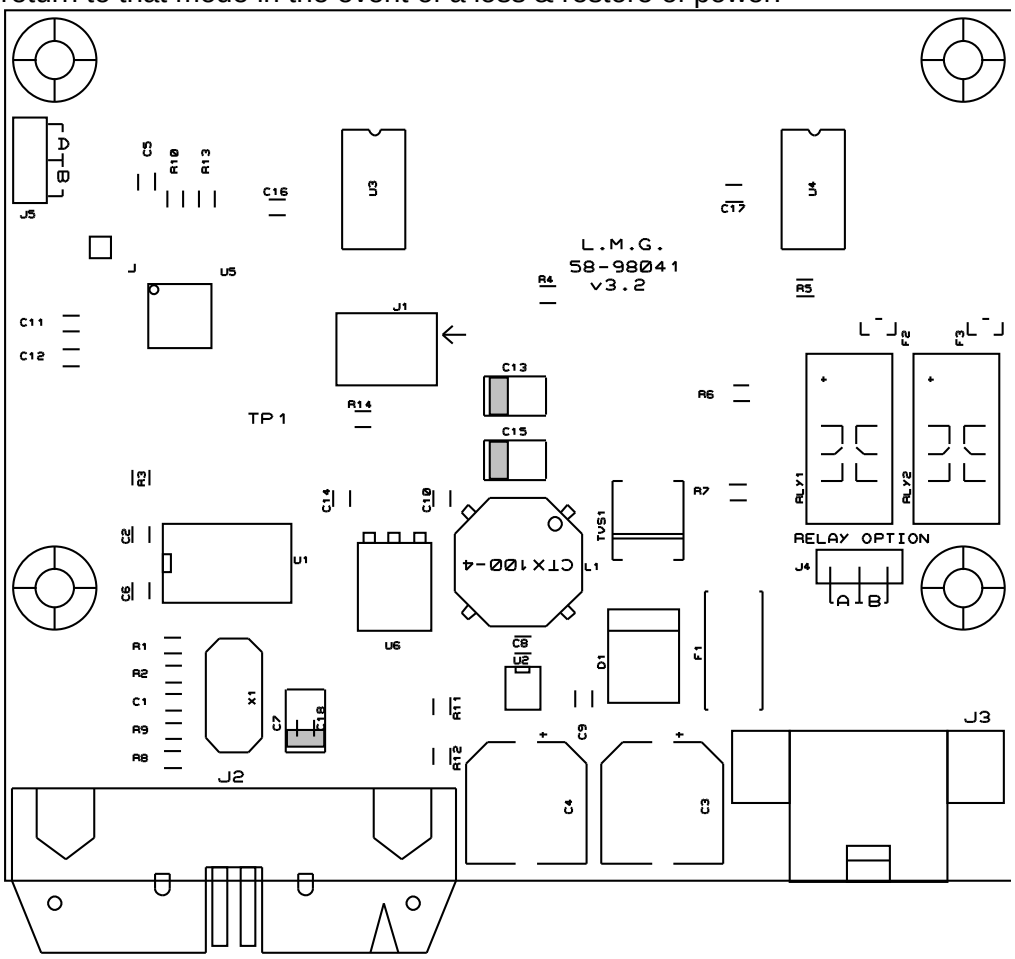


Figure 3 Jumper Locations

Changing The Relay Jumper (J4)
Jumper J4 is only used when the user wants to use the unit in dual relay modes.
If the unit is used in any of the single relay modes, the jumper should be in position “ A “.
When in any of the dual relay modes, it should be placed into position “ B “. The following modes are used when in position “ A “: 0,1,2,3,4,5,6,7,11,12, 13. While in the other modes: 8,9,10, you should move the shorting jumper to position “ B “.

You may now close the lid and fasten it down. Programming is now complete.

Setting switches for DTMF code, Radio Channel Select and Timer (See Figure 4) -
Setting DTMF code:
To set the DTMF code, start at the leftmost of the “DTMF Digit Set” switches and adjust each switch to the corresponding position. The code may be up to six digits in length. If the code is to be shorter, set the switch after the last digit to “D”. For setting the code, switch positions 0-9 correspond the DTMF 0-9, switch positions A, B & C correspond to DTMF A, B & C, switch position D signifies “end-of-code” and switch positions E & F correspond to “*” & “#”.
Examples – To set the code to “1-5-3”, set the switches to “1-5-3-D”. The positions of the 5th & 6th switches are irrelevant in this example.

Selecting radio channel:

The list of channels programmed into the radio is normally affixed to the front of the unit, near the Radio Channel Select switch. Find the frequency you need in the list and turn the Select switch to the corresponding position.

Timer:
The 14-99005V2 Model has several modes that use a timer adjustable in 1-second, 10-second or 1-minute intervals. The time is selected using the “Time Set” rotary switch on the front panel. Switch positions 1 – 15 each correspond to one time increment. For modes with 1-second increments, positioning the “Time Set” switch to 5 will result in a relay active time of 5 seconds, for modes with a 10-second interval, 50 seconds and for modes with a 1-minute interval, 5 minutes. Putting the switch to the “0” position disables the unit. When in modes that do not use the timer, the position of the “Time Set” switch has no effect on the operation of the Activator, except that the “0” position disables the unit.

Antenna
The Radio DTMF Activator is often used to receive radio transmissions from a short distance, typically several hundred yards or less, so that an antenna is not typically necessary. The DTMF Activator comes with an antenna shorting plug (about 2” long – provides least sensitivity) and a “50 Ohm Load” (about 6” long - provides greater sensitivity, but ot as much as an antenna), and the radio receive sensitivity is programmed high, enabling the radio to receive from a nearby radio even when mounted in a metallic building. If, however, an antenna is used, a short handheld-type antenna may be mounted directly to the radio via BNC connector. The “Carrier Detect” may have to be reprogrammed if an antenna is used. Alternatively, an antenna may be mounted elsewhere and connected via cable. Note that if the antenna’s shield is connected to earth ground, the power supply return will be grounded also. If this is not acceptable in your application, you must then use an isolating power supply.

WARNING: Attaching an antenna with grounded shield will cause the power supply return to be grounded!

Radio Programming
The radio has been programmed at the factory and the frequencies are listed on the label on the front of the Activator. If the radio is to be re-programmed (e.g., to change channels or to adjust receive sensitivity) the radio (or the entire Activator), may be returned to Miller Ingenuity for reprogramming. (Depending on the situation, there may be a charge for this service.) The user may also reprogram the radio. If you choose to do the reprogramming, verify that you have the proper software and cables for the model radio in your Activator. The software and cables can be purchased directly from Ritron Radio in Carmel, IN (800-872-1872).

FIGURE 4
FRONT PANEL CLOSE-UP

Note on Radio Channel Numbering:
The channels are numbered differently in the radio and on the Radio DTMF Activator front panel. The following chart illustrates:

Radio Channel:	1	2	3	4	5	6	7	8
Activator Channel:	7	6	5	4	3	2	1	0

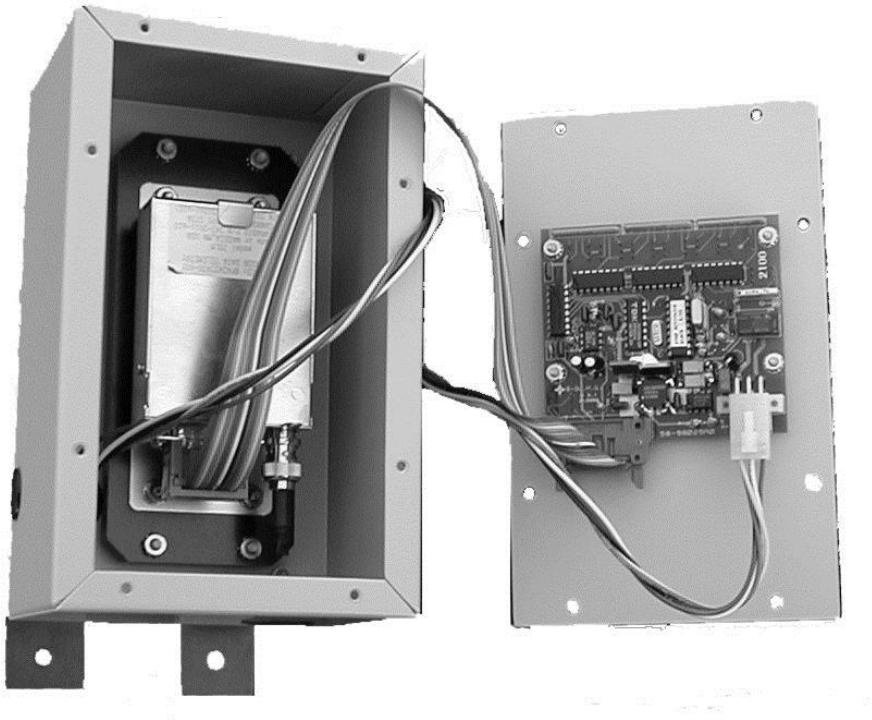


FIGURE 5
INSIDE OF RADIO DTMF ACTIVATOR

IV. OPERATION

When the unit is installed, powered-up and sitting idle, the “POWER” LED will be illuminated. When a radio signal on the frequency selected is received by the radio receiver, the “RADIO RECEIVING” LED is also illuminated. Whenever the DTMF decoder detects a DTMF digit (regardless if it is part of the selected code), the “DECODING” LED will be illuminated. Whenever the relay is activated, the “TIMER” LED is illuminated (this applies to models with the timed relay as well as to models with the “*”, “#” relay control).

OPERATING UNITS USING “RELAY-ON”/”RELAY-OFF” (Modes 0, 4)

- In Mode 0, the relay status (on or off) changes every time the proper DTMF code is decoded.
- In Mode 4, the relay is turned ON when the proper DTMF code followed by a “*” is decoded and it is turned off when the proper DTMF code followed by a “#” is detected. This mode corresponds to the “B” operational style in the original generation of Activators.

OPERATING UNITS USING TIMED ONLY MODES (Modes 1, 2, 3, 8, 9, 10, 11, 12 and 13)

- In Modes 1, 2 and 3, the relay is turned on whenever the proper DTMF code is detected and stays on according to the setting of the Time Set Switch. Mode 2 (10-second increments) corresponds to the “A” operational style in the original style of Activators.
- In Modes 8, 9 and 10, Relay 1 will energize when the proper DTMF code followed by a “*” is detected (NO contacts closed on energizing). Relay 2 will energize whenever the proper DTMF code followed by a “#” is detected (NC contacts opened on energizing). The relay will remain energized according to the setting of the Time Set Switch. Repeating the DTMF code while the relay is still energized will reset the timer. If the DTMF code for the unenergized relay is received while the other relay is energized, the energized relay will become deenergized and the 2nd relay will energize. Mode 8 (with 1-second increments) corresponds to the “C” operational mode in the original style of Activator.
- In Modes 11 and 12, the relay will energize when the proper DTMF code is detected, followed by a “*” and numbers xyz. In Mode 11, xyz indicates the number of seconds the relay will remain activated and in Mode 12, xyz indicates the number of minutes the relay will remain activated.

OPERATING UNITS USING COMBINATION ON/OFF & TIMED MODES (Modes 5, 6, 7 and 13)

In Modes 5, 6 and 7, the relay is activated then the proper DTMF code, followed by a “*” is detected. The relay is deenergized when either of the following conditions is met:

- The timer times out.
- The proper DTMF code followed by a “#” is detected (or “*” in mode 13).

Resetting the Timer Before It Times Out

Transmit the DTMF digits with a 2-way radio on the selected frequency. The relay will become energized and will remain energized for the amount of time set by the “TIME SET” switch. To hold the relay energized for a longer amount of time, re-transmit the DTMF digits before the relay times out. Once the digits have been detected, the timer will reset to the full time. If the time is set for 80 seconds and the DTMF digits are resent and detected after 40 seconds, the timer will reset and the relay will remain energized for a total of 120 seconds. This procedure can be repeated as necessary.

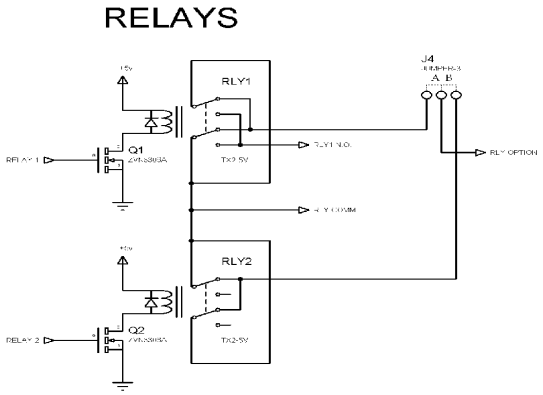


FIGURE 6
SCHEMATIC OF DUAL RELAY W/JUMPER

V. SERVICE & ORDERING

Warranty
The Radio DTMF Activator comes with a one year parts & labor warranty. If repairs become necessary during this period, call the factory for a Returned Material Authorization (RMA) number. Send the unit to the factory (freight prepaid), with the RMA number on the outside. Include contact information and a description of the problem. Damage due to abuse and misuse are not covered

Post-warranty repairs
If repairs become necessary after the warranty period, phone support is available to assist you in performing repairs. You can also send the unit to the factory for repair. Call first for an RMA number, send the unit (freight prepaid) with the RMA number on the outside and contact information and a description of the problem on the inside. Consult the factory for charges.

Ordering Information:
In order for us to configure your Activator appropriately, we need certain information at the time of ordering:

(1.) Mounting method (either signal rack or wall mount)
(2.) Operational Mode
(3.) Frequency band (e.g., VHF) and model of radio desired and
(4.) A list of up to eight radio frequencies (and/or AAR channels) to be programmed into the radio.

The first three items are incorporated into the part number (see below).

14-99005V2-"*x*yz" Radio DTMF Activator, with options *x, y* and *z*
Options: "*x*" – Mounting Method, A=Signal Rack Mounting, B=Wall Mounting
"*y*" – Operational Mode, choose one of Operational Modes 0 – 13
"*z*" – Radio: D=Ritron DTX Plus, VHF; E=Ritron DTX Plus, UHF

Example: 14-99005V2-B6D is an Activator, wall mounting, operational mode 6, with a Ritron DTX Plus VHF radio

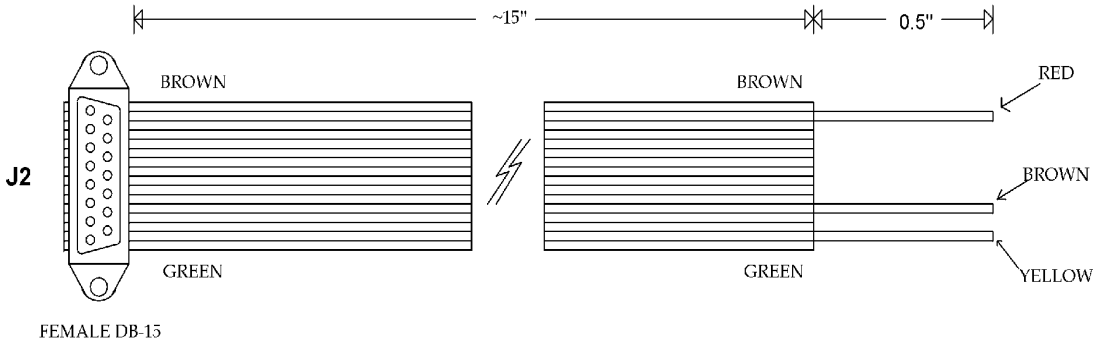
87-62008 Cable to enable programming radio without removing radio from enclosure. Programming software and cable from radio manufacturer is still required

Radio programming software and cable is available from Ritron. Ritron can be contacted at 800-872-1872.

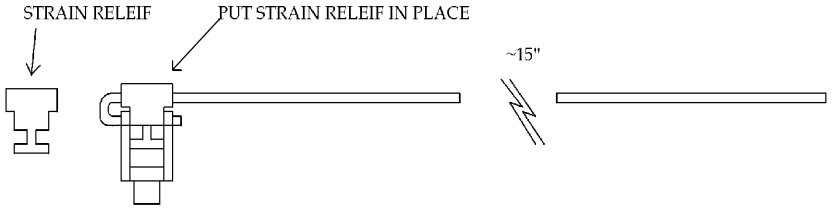
VI. DRAWINGS

Following is a drawing of the Programming Cable, p/n 87-62008.

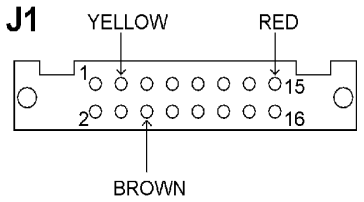
PARTS LIST	
J1	AHS16G
J2	CFM15G-ND
W1	ALPHA# 3583/16



STEP #1

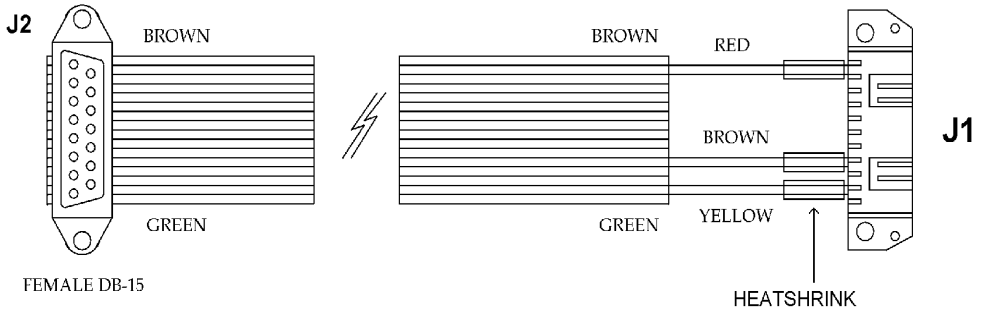


STEP #2



USED PINS 3, 6, 15

CUT PINS 1,2,4,5,7,8,9,10,11,12,13,14,1



STEP #3

APPROVALS	DATE
DRAWN J.C.P.	12-1-00
ENGR.	
CHECKED	
FINISH D.N.A.	
MISC.	

LARRY McGEE COMPANY
COMMUNICATION AND CONTROL SYSTEMS

TITLE: *ACTIVATOR PROG. CABLE*

NOTES:

SIZE	REV.	SHEET	DWG. NO.
	1	1/1	87-62008